Type I Progress Report - Nov. 15, 1972

Utilizing ERTS-A Imagery for Tectonic Analysis Through Study of
Bighorn Mts. Region, MMC #256
Principal Investigator - Richard A. Hoppin UN 633

To date 49 scenes, all MSS, have been received. Of these, 16 scenes are completely clear. Only one flight strip is unsatisfactory, this being one across the central Black Hills. The one set received of 3 scenes along this strip is too heavily covered by clouds. The rest of the area has been covered up to three times since September and clear scenes are available except for the central Black Hills. The current catalogues have been checked and we shall check later ones to see if this strip was taken but not sent.

We have not received any RBV or MSS taken in August. An order was sent over a month ago for acceptable scenes recorded in the catalogues. These have not been received. It would be helpful to get these, particularly the RBV.

Another order was sent for a few 9 x 9 prints. These, too, have not been received. Hopefully, these problems of ordering photographs will be resolved soon for we shall be requiring additional material soon. Meanwhile, we have made some trial runs using an enlarger in the department, and have had negatives and prints made by our Photo Service. These have turned out well, but this outside cost was not budgeted.

A supporting U-2 flight in August has provided us with two excellent east-west strips across the area. A subcontract has just been let with the Colorado State Flight Facility for I^2S and RC8 photography to be flown at 30,000 feet along portions of the same U-2 flight paths. An attempt will be made to fly these this month, but the considerable snow cover may delay this until next summer.

During this period the PI and the graduate assistant have examined all frames in a general manner and have begun compiling the image descriptor forms; the completed ones are included here. The Co-I's are helping in this task. The U-2 photography has also been examined. A preliminary plot of identifiable known structures has been made on overlays on the best ERTS-A frames and on the U-2 strips. In addition anomalous features have been noted.

Detailed analysis of the best images using a zoom binocular on a Richards light table is now beginning. This is to be supplemented later in the next period by image enhancement techniques using the Iowa Geological Survey's I^2S Addacol Viewer.

Our "first look" at the imagery has revealed several interesting features:

1. A superb scene of the Bighorn Mountains and Bighorn Basin shows several strong topographic lineaments within the uplift. One is the known Florence Pass lineament. The

other two have not been previously described - a.) a NE-SW line in the center of the range, b.) a N-S line including the West Tensleep glacial valley and cutting across the crest of the range and northwards along another glacial valley and ending at a sharp change in strike of the frontal ridges on the northeast flank of the range. These trends are partly shown on the 1:250,000 scale topographic maps, but not as striking as on the imagery. The Tensleep fault can be seen along the western portion but is not recognizable on the east side of the range. Although band 5 is best for general geologic study, band #7 suprisingly (at least in one frame) shows the drainage even better than #5. It almost looks like a SLAR image.

2. Many of the larger anticlines in the Bighorn Basin are recognizable. This is particularly true on the darker, more contrasting later imagery received as compared to the early lighter imagery.

3. In the Black Hills, the outer hogbacks are marked by conifers or, particularly in the Seven Sisters Range east of Hot Springs, by dip-slope (resequent) drainage patterns. An anomalous appearing feature SW of Hot Springs was found to be the Cascade anticline, an asymmetric anticline outlined by the resistant Minnekahta Limestone. The asymmetry is well shown by the contrasting drainage on the two limbs. Two small domes, Green Mt. (east of Sundance) and Strawberry Mt. show up quite well. InyanKara Mt. is quite visible although identification as an igneous plug is not really possible. Devils Tower is too small to be seen directly; its location can be found and it appears to be marked by its shadow. Several linears that were noted need further checking.

4. Towns and cities are not discernable in most cases and in only a few instances can one be sure of identification as such on positive transparencies. A quarry just NW of Rapid City is visible, but probably is not identifiable without prior knowledge.

At this point we do not plan any changes in our procedures. We urge again that there be more clarification on the procedure (or at least the response speed by GSFC) for obtaining additional imagery and prints, or indicate whether we should use other services.

No changes have been made in standing order forms. Data Request Forms were submitted on 30 October, 1972 and on 6 November, 1972.

As ERTS-A was launched later than originally scheduled and so could not obtain the early summer imagery, we would like to request that, if possible, coverage be resumed in May and June, 1973 to catch the early summer vegetation affects as initially proposed.

Respectfully submitted
Richard A. Hoppin

ERTS IMAGE DESCRIPTOR FORM

(See Instructions on Back)

NDPF USE ONLY
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N
ID

DATE 27 Nov. 72

PRINCIPAL INVESTIGATOR Dr. Richard Hoppin

GSFC UN633

ORGANIZATION University of Iowa

	PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
		Reservoir	Uplift	River	
*	1081-17064 4			✓	EEO airfield, highway badland
*	1081-17064 5	✓		✓	EEO airfield, badland EEO conifer, agriculture dam, prairie, grassland, quarry, uplift, hogback forest
*	1081-17064 6	✓	✓		agriculture, hogback, prairie, grassland, conifer
*	1081-17064 7	✓	✓	✓	agriculture, streams, prairie, grassland, hogback
	1063-17062 4			✓	badland, cirrus, grassland prairie
	1063-17062 5			✓	badland, agriculture cirrus, grassland, prairie
	1063-17062 6				agriculture, cirrus, grassland, prairie
	1063-17062 7	✓			agriculture, cirrus, dam grassland, prairie
*	1045-17063 4			✓	airfield, highway, cumulus badland
*	1045-17063 5			✓	EEO airfield, highway, cumulus, EEO badland, grassland, prairie
*	1045-17063 6				conifer, cumulus, forest
*	1045-17063 7	✓		✓	streams, agriculture, cumulus, dam, grassland, prairie
*	1081-17070 4				badland, conifer, hogback forest
*	1081-17070 5	✓	✓	✓	badland, anticline, dune, conifer hogback, prairie, forest
*	1081-17070 6	✓	✓		badland, dune, anticline, prairie
*	1081-17070 7	✓	✓		EEO dune, lakes, anticline prairie

*FOR DESCRIPTORS WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).

*frames with cloud cover 10% or less

MAIL TO NDPF USER SERVICES
CODE 563
BLDG 23 ROOM E413
NASA GSFC
GREENBELT, MD. 20771
301-982-5406

GSFC 37-2 (7/72)

ERTS IMAGE DESCRIPTOR FORM

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DATE 27 Nov. 72

PRINCIPAL INVESTIGATOR Dr. Richard Hoppin

GSFC UN633

ORGANIZATION University of Iowa

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
	Reservoir	Dune	River	
1063-17065 4				cirrus, cumulus, alto-stratus, cloudstreets
1063-17065 5		✓	✓	cirrus, cumulus, alto-stratus, conifer, cloud streets
1063-17065 6	✓			cirrus, cumulus, alto-stratus, dam, cloud-streets, agriculture
1063-17065 7	✓			cirrus, cumulus, alto-stratus, dam, cloud-streets, agriculture
1045-17065 4				badland, cumulus, cloudstreets, altostratus
1045-17065 5		✓		badland, uplift, conifer, cloud street, agriculture altostratus
1045-17065 6	✓			cloudstreets, altostratus
1045-17065 7	✓			cloud streets, agriculture altostratus
1046-17121 M				alto stratus, cumulus, cloud streets
1046-17115 4				cirrus, cumulus, strato-cumulus
1046-17115 5				agriculture, cirrus, cumulus, stratocumulus
1046-17115 6				cirrus, cumulus, strato-cumulus
1046-17115 7	✓			cirrus cumulus, strato cumulus
1064-17123 4				cloudstreets, cumulus
1064-17123 5			✓	uplift, conifer, cloud-streets, altocumulus
1004-17123 6				uplift, cloud street, alto-cumulus

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DATE 27 Nov. 72

PRINCIPAL INVESTIGATOR Dr. Richard Hoppin

GSFC UNG33

ORGANIZATION University of Iowa

	PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
		Reservoir	Uplift	River	
	1064-17123 7	✓	✓		cloud streets, altocumulus
	1065-17172 M			✓	cirrus, altocumulus stratocumulus
*	1047-17173 4			✓	
*	1047-17173 5			✓	conifer, agriculture, streams, prairie, forest
*	1047-17173 7	✓	✓	✓	
	1065-17175 4				cirrus, altostratus
	1065-17175 5		✓	✓	conifer, cirrus, alto-stratus, valley
	1065-17175 6		✓		cirrus, altostratus
	1065-17175 7	✓	✓		cirrus, altostratus
*	1047-17175 4		✓		
*	1047-17175 5		✓		EEO conifer, annular-drainage, lineament, EFO domes, fault, forest
*	1047-17175 7	✓	✓		
	1065-17181 M				cirrus
*	1047-17182 4				conifer, forest
*	1047-17182 5	✓	✓		conifer, EEO lineament, streams, basin, Fault, forest
*	1047-17182 7	✓	✓	✓	basin, EEO fault
	1066-17231 4	✓			cloudstreets, altostratus conifer
	1066-17231 6			✓	cloudstreets, altostratus
	1066-17231 7				cloud streets, streams

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GSFC 37-2 (7/72)

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22151

Date: April 11, 1973

Reply to Attn of: 954.01

Subject: NASA Document Discrepancy Report 73-152

To: Mr. E. E. Baker
Deputy General Manager
Informatics TISCO
P.O. Box 33
College Park, Maryland 20740

Re: N 73-13359

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☐ 2. Portions of this document are illegible when reproduced. Please provide a reproducible copy.

☐ 3. A microfiche reproduction is not legible. The case file was not received. Please provide at least an acceptable microfiche.

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☒ 6. Other: This document received as N 73-13359 contained only 2 pages, however, the count shown on the front of the document is 5 pages. The original ERTS (E72-10310) contains 5 pages as shown, but the last 3 pages are not reproducible. Please provide good copies of the missing pages, 3 thru 5.

April 24, 1973

TO: John Ashley
NTIS

Forwarded herewith is a complete paper copy of N73-13359 and also revised copies of the microfiche for N73-13359 and E72-10310 for your retention.

Sincerely,

John H. Ashley

Phone: 703-321-8517

E. E. Baker
Deputy General Manager

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